VIRGINIA'S TRIBUTARY STRATEGIES

A customized approach to reduce nutrient pollution in the rivers flowing into the Chesapeake Bay

Revising Virginia's Chesapeake Bay Tributary Strategies

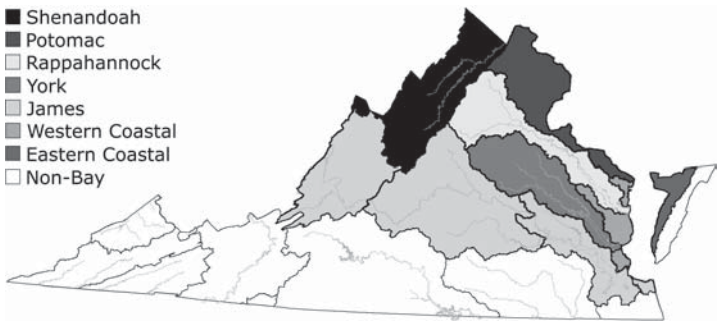
Virginia's Potomac Basin

Introduction

Since the early 1990s, Virginia has worked to develop and implement water quality plans, tributary nutrient reduction strategies, for each main tributary waterway of the Chesapeake Bay. These strategies have their beginnings in the Chesapeake Bay Program and the scientific research that identified excess nutrients, primarily nitrogen and phosphorus, and sediment as the greatest water quality problems faced by Chesapeake Bay and its tributaries.

Virginia's tributary strategies are based on a cooperative, voluntary approach to restoring water quality. In developing these strategies, Virginia's natural resources agencies work closely with local governments, farmers, conservation groups, wastewater treatment plant operators and others who have an important stake in ensuring clean water in their community. This locally based approach helped the commonwealth and its citizens craft tributary strategies with effective solutions rooted in practical methods.

Virginia's Bay Watersheds



Va. Potomac Watershed Fast Facts

- *Drainage in Acres: 3,649,195 (1,768,841 in Potomac, 1,880,354 in Shenandoah)*
- *Square Miles: 5,723 (2,763 in Potomac, 2,960 in Shenandoah)*
- *About 6.5 percent of Virginia's land*
- *Length: 383 miles (W.Va., Md., D.C., Va.)*
- *Counties: 9 (Arlington, Loudoun, Fairfax, Prince William, Fauquier, Stafford, King George, Westmoreland, Northumberland)*
- *Cities: Five (Alexandria, Fairfax, Falls Church, Manassas, Manassas Park)*
- *2000 Population: 2,011,098*
- *Larger Tributaries: Occoquan River, Bull Run, Four Mile Run, Difficult Run, Quantico Creek, Aquia Creek, Potomac Creek*

Today Virginia and her bay state partners face a new and daunting chapter in restoring water quality that will sustain living resources and aquatic habitats in the bay and its tidal tributaries. Changing water quality conditions have led Chesapeake Bay partners to develop new nutrient and sediment reduction goals. An ambitious timetable adopted in the new Chesapeake Bay Agreement, *Chesapeake 2000*, calls for removing the bay and its tidal tributaries from the federal list of impaired waters by 2010. With the new goals in hand, Virginia is now embarking on a process with local stakeholders to revise existing tributary strategies. Natural resource agency staff will work with stakeholders in each basin seeking common agreement on what needs to be done and how best to do it.

Focus on Nutrients and Sediment

Nutrient enrichment is a surplus of phosphorus and nitrogen that runs off land, settles from the air or is discharged from industrial or municipal sources. It's one of the bay system's key pollution problems.

Another is sediment that comes mainly from erosion. It can smother aquatic plants and animals.

The rivers and the bay support various valuable living resources such as oysters, fish, crabs, waterfowl

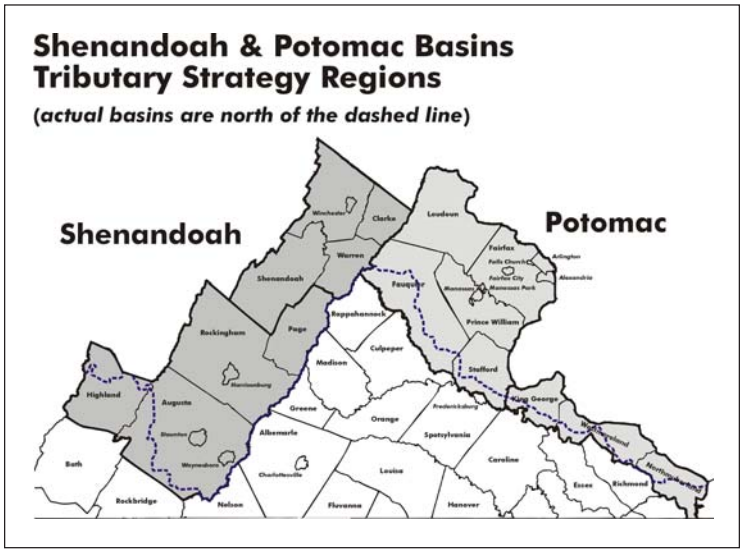
and many kinds of underwater plants. This aquatic life needs dissolved oxygen to survive. But excess nitrogen and phosphorus over-fertilize bay waters causing an abundance of algae that prevent sunlight from reaching underwater plants. When the algae die, the decay process robs the water of oxygen.

Nutrients occur naturally and would flow into bay waters even if people were not living around its shores. But excess amounts of nutrients come from sewage treatment plants, some industries, agricultural and lawn fertilizers, and a variety of other sources.

There are two main pathways nitrogen and phosphorus take to enter the bay and its rivers. One is *point source pollution*, which occurs primarily when sewage treatment plants and industrial facilities discharge treated wastewater into a river or stream. The other is *nonpoint source pollution*, most of which is runoff from farm and pasture land, and from development in urban and suburban areas.

For point sources, Biological Nutrient Removal (BNR) technology is one key to success. BNR can eliminate between 60 and 85 percent of the nutrients that treatment plants discharge.

For nonpoint source pollution, best management practices (BMPs) are the key to reducing nutrient levels. Farmers, in particular, can and do reduce nonpoint source pollution by conscientiously managing agricultural land. The core of the nonpoint portion of any tributary strategy is the continuation of current programs and activities, such as farm plan implementation, conservation tillage, nutrient management, and management of animal wastes and highly erodible lands, plus greater focus on lawn care by homeowners. Stormwater management also is key to eventual success in nutrient and sediment reductions.



Natural resource agency staff will work with stakeholders in each basin seeking common agreement on what needs to be done and the best ways to do it.

The Potomac River Watershed

The Potomac is often referred to as our *nation's river* because it flows through Washington, D.C. The river's watershed encompasses portions of Virginia, West Virginia, Maryland, Pennsylvania and Washington, D.C. It covers about 14,679 square miles, with Virginia having the largest drainage area at 5,723 square miles, which is about 6 percent of the state's land base. The entire watershed's 2000 population was about 5.25 million, with Virginia's portion at slightly more than two million. The Potomac meanders over 383 miles from Fairfax Stone, W. Va., to Point Lookout, Md. Forests cover 57 percent of the entire watershed's land, agriculture accounts for 32 percent and urban areas cover 5 percent.

Major Pollutants

Like the other sub-watersheds of the Chesapeake Bay, the major pollutants affecting the Potomac are nitrogen, phosphorus and sediment. Many local governments and other experts cite sewage treatment, overuse of fertilizers, insufficient farm conservation practices, failing septic systems and impacts of urban development as major sources of these pollutants.

Methods of Controlling Pollution

There are many effective ways to curtail pollution in the Potomac watershed. Public education on proper lawn care and maintenance of septic systems, municipal wastewater treatment upgrades, increased installation of agricultural and forestry best management practices (BMPs), improved stormwater management, and erosion and sediment control are but a few. Individual citizens can become involved in hands-on programs such as DCR's Adopt-A-Stream Program and water monitoring activities that encourage environmental awareness and stewardship.

Watershed Management Planning

Watershed management planning is a detailed vision and strategy to manage watersheds, usually at the local level. Plans identify actions to restore habitat and water quality, detail lands for conservation and appropriate development, specify locations of and ways to reduce

point and nonpoint sources of pollution, and prioritize pollution reduction actions. Watershed management planning is underway throughout Virginia's Potomac watershed. For example, the Reston Homeowners Association in Fairfax County has written an award-winning plan, Arlington County's citizens are extensively involved in local watershed management planning, Prince William and Loudoun counties use geographic information systems (GIS) to manage water resources on a watershed level, and Fauquier County has partnered with its local soil and water conservation district to better reach farmers.

Previous Tributary Strategy Work

The initial S*henandoah and Potomac River Basins Tributary Nutrient Reduction Strategy* was completed in December 1996. It provided information on water quality and living resource habitat conditions in the Shenandoah and Potomac rivers. More importantly, it began, and in most cases completed, actions for reducing identified pollutants. Many of these accomplishments where achieved through the work of soil and water conservation districts in cooperation with the farming community and local governments. The strategy also provided an overview of additional management actions that could further restore the health and productivity of the river. Many of these actions were funded in subsequent years through state and federal grants.

The Chesapeake Bay Program's computer-based Water Quality Model also enabled identification of allocation loads – "caps" – for nitrogen, phosphorus and sediment. With such information in hand, a diverse working group of representatives from public wastewater treatment facilities, community watershed organizations, soil and water conservation districts, industry and local governments produced the *Interim Nutrient Cap Strategy for the Shenandoah and Potomac River Basins* in March 2001.

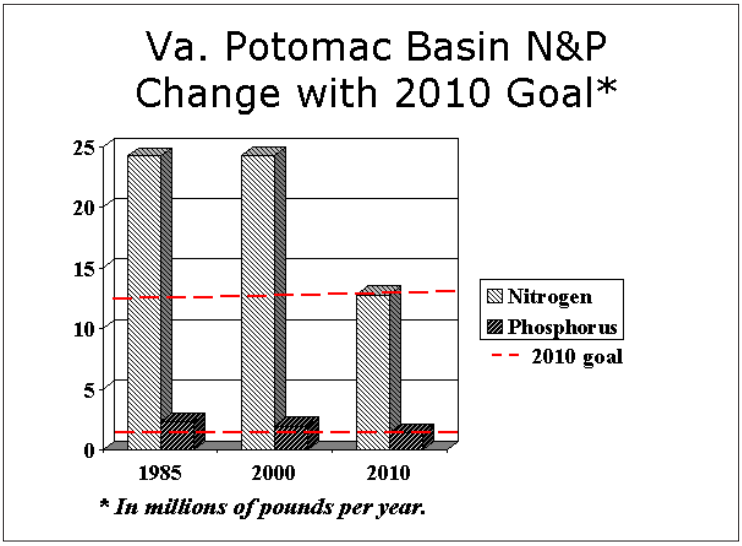
New Load Allocations for the Potomac River Watershed

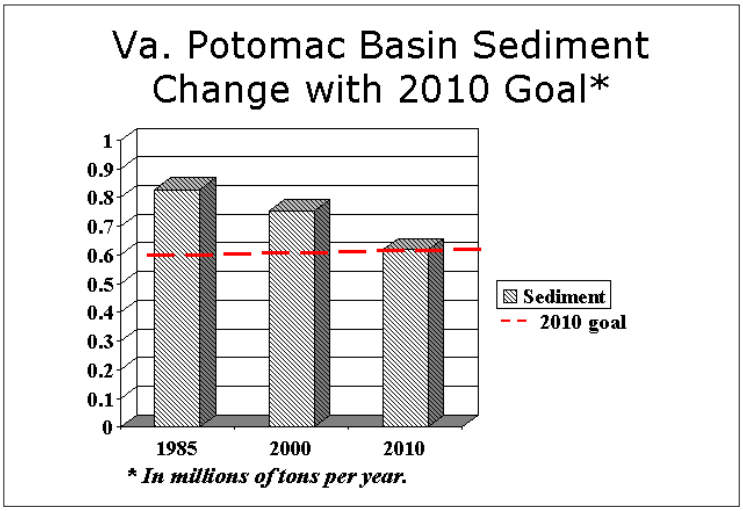
New nutrient and sediment load allocations were determined by the multi-jurisdictional Chesapeake Bay Program for all of the sub-watersheds of the larger Chesapeake Bay watershed. Changes for the Potomac River will be challenging and must occur in a relatively short period of time.

The new cap allocation for nitrogen in the Potomac basin is 12.84 million pounds per year, compared with an actual load of 24.3 million pounds in 2000. The new cap allocation for phosphorus is 1.4 million pounds, compared with an actual load of 1.96 million pounds in 2000. The new cap allocation for sediment in the basin is 617,000 tons per year, compared with 753,000 tons in 2000. This sediment allocation does not include loading from shoreline erosion.

Virginia Potomac Watershed: C2K total nitrogen, phosphorus and sediment cap load allocations (includes point and nonpoint source pollution)

Year	Tot. N (million lbs/yr)	Tot. P (million lbs/yr)	Sediment (million tons/yr)
1985	24.2	2.31	.828
2000	24.3	1.96	.753
CAP	12.8	1.4	.617
% CHG 85-00	.4%	-15%	-9%
% CHG 00-CAP	-47%	-29%	-18%





The above table and charts show the change in total nitrogen, phosphorus and sediment in the Potomac watershed between the original baseline year, 1985, and the newly established baseline year of 2000. Accomplishments within that 15-year period are displayed in the table as a percent change for each pollutant. The cap loads, which were set by the Chesapeake Bay Program, have been determined for each pollutant and are also listed above. The newly

revised tributary strategy will devise a plan on how to meet and maintain the updated, reduced loads.

What Lies Ahead

Between now and April 2004, the state will redouble its efforts to revise the Potomac River Tributary Strategy. The state will work with diverse stakeholders representing local governments, agricultural and development communities, soil and water conservation districts, wastewater treatment operators, planning district commissions, conservation groups and others to develop a strategy unique to the Potomac watershed. The strategy is meant to meet the assigned nutrient and sediment reduction goals.

This new strategy will provide a menu of reduction actions that focus on varied pollution sources and land uses. As in past strategies, agricultural practices and wastewater treatment plant improvements will be important. It is also anticipated that the strategy will focus more on urban and suburban stormwater management, changing land use, low impact development and public education than did previous work.

The strategy will examine reductions that can be achieved locally with existing resources. It will explore what might be achieved locally with additional resources and what could be accomplished through broader statewide initiatives.

The strategy will outline a phased approach to implementation and to capping nutrient and sediment loads once the reduction goals are reached. It will also look at the future need to track nutrient and sediment loads and allocations as this reduction strategy becomes a cap strategy.

Become involved in this important process. For more information on the development of the new Potomac River Tributary Strategy or on other water quality initiatives in the watershed, contact Marc Aveni, (540) 347-6422, *maveni@dcr.state.va.us*.